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65913 7590 10/07/2009

NXP, B.V.
NXP INTELLECTUAL PROPERTY & LICENSING
M/S41-SJ
1109 MCKAY DRIVE
SAN JOSE, CA 95131

EXAMINER

PEREZ, JAMES M

ART UNIT

PAPER NUMBER

2611

DATE MAILED: 10/07/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/533,058

04/27/2005

Mihai Adrian Tiberiu Sanduleanu

NL02 1079 US

9258

TITLE OF INVENTION: PLL USING UNBALANCED QUADRICORRELATOR

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	01/07/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
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P.O. Box 1450
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

65913 7590 10/07/2009

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I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/533,058 04/27/2005 Mihai Adrian Tiberiu Sanduleanu NL02 1079 US 9258

TITLE OF INVENTION: PLL USING UNBALANCED QUADRICORRELATOR

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nonprovisional NO \$1510 \$300 \$0 \$1810 01/07/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
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PEREZ, JAMES M 2611 375-376000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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10/533,058	04/27/2005	Mihai Adrian Tiberiu Sanduleanu	NL02 1079 US	9258
65913	7590	10/07/2009	EXAMINER	
NXP, B.V. NXP INTELLECTUAL PROPERTY & LICENSING M/S41-SJ 1109 MCKAY DRIVE SAN JOSE, CA 95131			PEREZ, JAMES M	
			ART UNIT	PAPER NUMBER
			2611	
			DATE MAILED: 10/07/2009	

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 517 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 517 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability**Application No.**

10/533,058

Applicant(s)SANDULEANU, MIHAI ADRIAN
TIBERIU**Examiner**

JAMES M. PEREZ

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 7/29/2009.
2. ☒ The allowed claim(s) is/are 1,2 and 5-9.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

/James M Perez/
Examiner, Art Unit 2611

Detailed Action

This action is responsive to the amendments filed on 7/29/2009.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

The following changes have been made as stated below:

(1) In claim 1, line 11 change the following wording:

"bitrate" to

---bit-rate---

(2) In claim 1, line 13 change the following wording:

"D flip flop" to

---D flip-flop---

(3) In claim 8, line 23 change the following wording:

"bitrate" to

---bit-rate---

(4) In claim 8, line 30 change the following wording:

"D flip flop" to

---D flip-flop---

Allowable Subject Matter

2. Claims 1-2 and 5-9 are allowed.

3. The following is an examiner's statement of reasons for allowance:

(1) With respect to claims 1-2 and 5-6, the present invention comprises a Phase Locked Loop (PLL), for synchronization of a clock signal with an incoming data signal, comprising a frequency detector including an unbalanced quadricorrelator, the quadricorrelator including a first multiplexer, a second multiplexer, and double edge clocked bi-stable circuits, supplied by incoming mutually quadrature phase shifted signals and coupled to the first multiplexer and to the second multiplexer, the first and second multiplexers controlled by a signal having a same bit-rate as the incoming signal; a first phase detector that includes a D flip flop that receives, as a data input, a first signal pair provided by the first multiplexer and that is clocked by a second signal pair provided by the second multiplexer; a first transistor pair receiving the second signal pair on respective gates for determining a state ON or OFF of a current through the first transistor pair; and a second transistor pair biased by current through the first transistor pair and receiving the first signal pair and generating an output signal indicative for a frequency error between the incoming data signal and the clock signal. The closest prior art, Moser (United States Patent No. 6,853,696), shows a similar system which also includes a phase locked loop comprising a frequency detector including an unbalanced quadricorrelator utilizing D flip-flops and multiplexers. However Moser fails to disclose the frequency detector including unbalanced quadricorrelator as claimed, first phase detector as claimed, first transistor pair as

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claimed, and second transistor pair as claimed. The distinct features have been added to independent claim 1, therefore rendering claims 1-2 and 5-6 allowable.

(2) With respect to claim 7, the present invention comprises a Phase Locked Loop for synchronization with an incoming data signal, comprising a voltage controlled oscillator generating mutually quadrature phase shifted a frequency detector including an unbalanced quadricorrelator, the quadricorrelator including a first multiplexer, a second multiplexer, a first pair of double edge clocked bi-stable circuits, a second pair of double edge clocked bi-stable circuits, wherein the first pair and the second pair of double edge clocked bi-stable circuits are supplied by the mutually quadrature phase shifted signals, respectively, to provide a first signal pair and a second signal pair indicative of a phase difference between the incoming data signal and the mutually quadrature phase shifted signals, and a phase detector controlled by a first signal pair provided by the first multiplexer and by a second signal pair provided by the second multiplexer; a first low-pass filter; a second low-pass filter; an adder; a first charge pump for inputting a coarse control input for the voltage controlled oscillator using a frequency error signal produced by the quadricorrelator and coupled to the first low-pass filter and to the adder; a second charge pump; and a further phase detector; wherein a fine control input is controlled by a signal provided by the further phase detector coupled to the second charge pump coupled to the second low-pass filter. The closest prior art, Moser (United States Patent No. 6,853,696), shows a similar system which also includes a phase locked loop comprising a frequency detector including an unbalanced

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quadricorrelator utilizing D flip-flops (bi-stable circuits) and multiplexers, local clock generator, a charge pump, loop filter, and phase detector. However Moser fails to disclose the frequency detector as claimed, phase detectors as claimed, the low-pass filters as claimed, and VCO as claimed. The distinct features have been added to independent claim 7, therefore rendering claim 7 allowable.

(3) With respect to claim 8, the present invention comprises a Phase Locked Loop, for use with an incoming data comprising: a voltage controlled oscillator having a coarse control input and a fine control input and generating mutually quadrature phase-shifted signals; a first charge pump; a second charge pump; a first low-pass filter; a second low-pass filter; an adder; a quadricorrelator generating a frequency error signal inputted to the coarse control input of the voltage controlled oscillator via the first charge pump coupled to the first low-pass filter coupled to the adder, the quadricorrelator including a frequency detector including a first multiplexer, a second multiplexer, a first pair of double edge clocked bi-stable circuits coupled to the first multiplexer and a second pair of double edge clocked bi-stable circuits coupled to the second multiplexer to provide a second signal pair, the first and second pairs of bi-stable circuits being supplied by the mutually quadrature phase shifted signals, the first and second multiplexers being controlled by a signal having a same bit-rate as the incoming signal and respectively providing a first signal pair and a second signal pair indicative for a phase difference between an incoming signal and the mutually quadrature phase shifted signals; a transistor pair; and a phase detector controlled by the first signal pair and the second

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signal pair, the phase detector including a D flip-flop receiving the first signal pair and being clocked by the second signal pair, the second signal pair being inputted to respective gates of the transistor pair for determining a state ON or OFF of a current through said transistor pair; and a second phase detector generating a phase error inputted to the fine control input of the voltage controlled oscillator via the second charge pump coupled to the second low-pass filter. The closest prior art, Moser (United States Patent No. 6,853,696), shows a similar system which also includes a phase locked loop comprising a frequency detector including an unbalanced quadricorrelator utilizing D flip-flops and multiplexers, local clock generator, a charge pump, loop filter, and phase detector. However Moser fails to disclose the frequency detector as claimed, phase detectors as claimed, the low-pass filters as claimed, and VCO as claimed. The distinct features have been added to independent claim 8, therefore rendering claims 8 and 9 allowable.

4. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES M. PEREZ whose telephone number is (571)270-3231. The examiner can normally be reached on Monday through Friday: 9am to 5pm EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James M Perez/

Examiner, Art Unit 2611

9/29/2009

/Shuwang Liu/

Supervisory Patent Examiner, Art Unit 2611